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September 26, 2016

VIA ECFS

Brian Regan
Associate Bureau Chief
Wireless Telecommunications Bureau
Federal Communications Commission
441 12th Street, SW
Washington, DC 20006

RE: Proposal of Sony for Certification as a SAS Administrator
Request for Supplemental Information
GN Docket 15-319

Mr. Regan:

Sony Corporation ("Sony") submits the following response to the Commission's Request for Supplemental Information, dated September 2, 2016, regarding Sony's proposal seeking conditional approval to operate as a Spectrum Access System ("SAS") Administrator in the 3550-3700 MHz Band.

Pursuant to Section 0.459 of the Commission's rules, Sony requests confidential treatment for portions of its responses to Questions 2, 6, 9, and 20, and for the entirety of its response to Question 22, which is included as Annex A. These responses consist of commercial information and trade secrets regarding the implementation details of Sony's proposal, and public disclosure would undermine Sony's ability to offer a competitive SAS. This information has not previously been shared outside of Sony, including to the public or to third parties. Sony asks that these responses remain confidential until the Sony SAS has been approved and implemented, at which point any potential for competitive harm will no longer exist. Sony asks that the Commission return this submission if this request for confidentiality is denied. Sony consents to the sharing of its complete response with other Federal government agencies.

Please contact the undersigned with any questions about this submission or confidentiality request.

Respectfully submitted,

_____/s/_____
James Morgan
Director and Counsel
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1. **WTB/OET recently released a Public Notice establishing the final methodology for determining Grandfathered Wireless Protection Zones. Please update your proposal to describe how your SAS will protect Grandfathered Wireless Broadband Licensees accordingly.**

   The Sony SAS will access the FCC Universal Licensing System (ULS) to obtain the necessary geolocation and frequency information for the protected licensees. As required by the Commission's August 19, 2016 Public Notice,[1] the Sony SAS will enforce a Grandfathered Wireless Protection Zone around each eligible registered base station. This Zone will be defined by: (1) for sectors encompassing unregistered CPE, a 5.3 km radius sector from each registered base station based on the azimuth and beam width registered for that base station; and (2) for sectors encompassing registered CPE, a sector centered on each base station with the registered azimuth and beam width covering all registered subscriber stations within that sector.[2] The Sony SAS will ensure that the aggregate power of co-channel CBSDs not exceed -80 dBm/10 MHz at any point inside the Protection Zone.

2. **Sony's proposal states that it will perform a detailed channel interference assessment to determine whether the channel proposed by the CBSD is acceptable. Please describe the methodology and criteria for frequency assignment to PAL and GAA users and explain in detail how the Sony SAS will meet the requirements to determine and provide to CBSDs the permissible channels and power levels.**

   <u>Methodology and criteria for frequency assignment and output power to PAL users</u>

   The Sony SAS will enforce the band plan specified in the Commission's rules, consistent with the relevant Wireless Innovation Forum ("WInnF") specification.[3] It will assign "steady-state" channels to PALs, will assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area where feasible, and will cooperate with other SAS administrators to coordinate PAL channel assignment. It will support the Commission's goals of maximizing spectrum efficiency and utilization.
   More specifically, the Sony SAS will:

   - authorize each PAL to use a 10 MHz channel in the 3550-3650 MHz band;
   - authorize no more than seven PALs in any given License Area at any given time;
   - reserve the 3650-3700 MHz band for Grandfathered Wireless Broadband Licensees and GAA Users;
   - allow Priority Access Licensees to aggregate up to four PAL channels in any License Area at any given time;
   - ensure that each PAL consists of a single License Area;
   - assign geographically contiguous PALs held by the same PAL licensee to the same channels in each geographic area, to the extent feasible;
   - assign multiple channels held by the same PAL licensee to contiguous channels in the

[1] *Wireless Telecommunications Bureau and Office of Engineering and Technology Announce Methodology for Determining the Protected Contours for Grandfathered 3650-3700 MHz Band Licensees*, GN Docket No. 12-354, Public Notice, 2016 WL 4432651 (Aug. 19, 2016) (*Public Notice)*.
[2] *Public Notice* at 6-7.
[3] WINNF-15-S-0112: "Requirements for Commercial Operation in the U.S. 3550-3700 MHz Citizens Broadband Radio Service Band."

same License Area, to the extent feasible;
- temporarily reassign individual PALs held by the same licensee to different channels, so that geographical contiguity is temporarily not maintained, to the extent necessary to protect Incumbent users or if necessary to perform its required functions;
- temporarily reassign individual PALs to noncontiguous channels to the extent necessary to protect Incumbent users or if necessary to perform its required functions.

For output power calculation and its criteria, Sony will implement industry agreed methodology to satisfy the requirement. Sony is actively participating in standardization efforts at the WInnF.

Methodology and criteria for frequency assignment and output power to GAA users

The Sony SAS will conduct GAA frequency assignments using the methodology specified in IEEE 802.19.1-2014, ,[4] and will calculate output power using the methodology specified in ECC Report 186, .[5] Sony is actively participating in standardization efforts at the WInnF to specify the necessary criteria.

3. Sony makes reference to calculation methodologies in ECC Report 186 and methodologies in IEEE Std. 802.19.1-2014 and ETSI EN 303 145 V.1.2.1, for calculating aggregate interference. Please explain in detail how Sony will use these calculation methodologies to protect Priority Access Licensees from interference caused by other PALs and from General Authorized Access Users, including the calculation and enforcement of PAL Protection Areas.

The Sony SAS will calculate and enforce PAL Protection Areas consistent with the requirements set forth in 47 C.F.R. 96.25(c)(2), with a default protection contour of −96 dBm/10 MHz around each CBSD. As required by 47 C.F.R. 96.41(d), the Sony SAS will not authorize CBSDs in a manner that will cause aggregate interference in excess of -80 dBm/10 MHz within a PAL Protection Area. However, the Sony SAS will not use methodologies in ECC Report 186, IEEE Std. 802.19.1-2014, or ETSI EN 303 145 to calculate aggregate interference for PAL protection areas. Rather, Sony is actively participating in standardization efforts at the Wireless Innovation Forum, and will implement the requirements and methodologies that result that process.

4. Sony states that it will enforce exclusion zones until one or more ESCs are approved, and thereafter, Sony SAS will authorize Category A CBSD operations within protection zones.

a. Please explain in more detail how this will be accomplished

Before one or more ESCs are approved, the Sony SAS will access the data necessary to identify the exclusion zones from the NTIA website (ntia.doc.gov/category/3550-3650-mhz) and, as required by 47 C.F.R. 96.15(a)(3)(i), and will only authorize Category A CBSDs in geographic areas outside of these exclusion zones. It will not authorize any Category B CBSDs at that time.

[4] IEEE Std. 802.19.1-2014 "IEEE Standard for Information technology -Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 19: TV White Space Coexistence Methods."
[5] ECC Report 186 "Technical and operational requirements for the operation of white space devices under geo-location approach," January 2013.

Following the approval of one or more ESCs, the Sony SAS will authorize both Category A and Category B CBSDs within protection zones. However, within 300 seconds of receiving a communication that an ESC has detected federal use on a given frequency within a protection zone, the Sony SAS will instruct any associated CBSDs operating on that frequency and in that geographic area to cease operations. If, after ceasing operations, a CBSD requests authorization to continue operating within the protection zone, the Sony SAS will attempt to reauthorize the CBSD on a new, unoccupied frequency, if available.

b. It is unclear if Sony is proposing to support both Category A and Category B CBSDs. Please clarify.

The Sony SAS will support both Category A and Category B CBSDs.

5. Sony states that it plans to cooperate with ESC operators and other SAS administrators to develop a process including the development of a standardized interface for communications. Sony cannot proceed with Phase II until it can adequately demonstrate that it meets all applicable rules, including identification of an ESC partner(s) and demonstrating, through testing, that the SAS is capable of meeting all requirements.

a. To this end, what is Sony's plan to work with an ESC?

We are investigating relationships with a number of ESC operators, and understand the need to identify at least one such partner before receiving authorization to serve as a SAS administrator for Category A CBSDs operating in a protection zone, and for Category B CBSDs.

b. How will you address non-standard interfaces with a partner ESC(s)? Please clarify the standardization and method Sony will implement for the SAS-5 interface between SAS and ESCs, including whether such interface will be proprietary, or open and standardized.

Sony will collaborate with its ESC operator partner(s) to develop the protocols necessary to enable ESC-SAS communication. The Sony SAS will be based on generic system architecture, and will be adaptable to operate with either or both proprietary and open and standardized ESC interfaces, depending on specifications developed with its ESC operator partner(s).

c. Please explain what information will be exchanged between your SAS and your partner ESC(s).

As noted above, Sony plans to collaborate with its ESC operator partner(s) to develop the interfaces necessary to enable ESC-SAS communication, and as such has not finalized what information will be exchanged between the Sony SAS and our partner ESC(s). Sony expects that this information will include, for example, geolocation, frequency, time, and the maximum permitted EIRP as well as any information necessary

to establish encrypted communications links.

6. How will the SAS facilitate GAA Category B CBSD coordination?

The Sony SAS will conduct GAA frequency assignments using the methodology specified in IEEE 802.19.1-2014, , and will calculate output power using the methodology specified in ECC Report 186, . Sony is actively participating in standardization efforts at the WInnF to specify the necessary criteria. To facilitate GAA Category B CBSD coordination with considering CBSDs that have been authorized by a non-Sony SAS, the Sony SAS will implement SAS-to-SAS protocols currently under development by the WInnF.

7. How will the SAS resolve conflicting uses of the band while maintaining a stable radio frequency environment?

The Sony SAS will enforce the band plan specified in the Commission's Part 96 rules, consistent with the relevant WInnF specification. It will assign "steady-state" channels to PALs, and will cooperate with other SAS administrators to coordinate PAL channel assignment. It support the Commission's goals of maximizing spectrum efficiency and utilization.

8. Please affirm that the CBSDs are subject to current and future international agreements with Mexico and Canada, and the Sony SAS will implement the terms of these agreements as they relate to CBSDs.

The Sony SAS will store GIS files for the US-Canada and US-Mexico borders, and will use this data to enforce protections in compliance with current and future international agreements.

9. Please explain in detail how the Sony SAS will receive reports of interference and requests for additional protection from Incumbent Access users and address those interference issues. Please indicate if any industry agreed procedures will be used (provide exact references) and if your implementation includes any variation/extension of industry agreed procedures.

Sony is not aware of any industry agreed procedure for receiving reports of interference and requests for additional protection from Incumbent users. However, if such an industry agreed procedure is developed, Sony will implement it.

To enable the required functionality, Sony is developing a password-protected web application that will enable the Commission and Incumbent users to have direct access to the data in the Sony SAS without requiring any additional involvement by Sony.

10. Provide additional details to demonstrate specifically how each of the information gathering and retention requirements will be met.

As required by Section 96.55 of the Commission's rules, the Sony SAS will implement the following information gathering and retention policies:

1) The Sony SAS shall maintain current information on registered CBSDs, and this information will include the following, as required by Sections 96.39 and 96.45 of the Commission's rules:

    a. geographic location
    b. antenna height above ground level (in meters)
    c. CBSD class (Category A/Category B)
    d. requested authorization status (Priority Access or General Authorized Access)
    e. FCC identification number
    f. call sign
    g. user contact information
    h. air interface technology
    i. unique manufacturer's serial number
    j. sensing capabilities

    In addition, for Category B CBSDs, the Sony SAS will also maintain the following:

    a. antenna gain
    b. beamwidth
    c. azimuth
    d. downtilt angle
    e. antenna height above ground level

    The Sony SAS shall make any information necessary to effectively coordinate operations between and among CBSDs available to other SAS administrators, and will exchange this

information with other SAS administrators a minimum of once per week.

2) The Sony SAS will maintain information about the geographic locations and configuration of protected FSS earth stations, and will obtain this information from the Commission's web site at www.fcc.gov/cbrs-protected-fss-site.

3) The Sony SAS will obtain and the federal Incumbent User Exclusion Zones and Protection Zones, both along the Coastline, and around federal radiolocation sites, from the NTIA website at ntia.doc.gov/category/3550-3650-mhz. The Sony SAS will only retain records of this federal incumbent information in accordance with information retention policies established as part of the ESC approval process.

4) The Sony SAS shall also make CBSD registration information available to the general public, but shall obfuscate the identities of the licensees in any public disclosures.

5) The Sony SAS will maintain records of all information that does not pertain to federal Incumbent user transmissions for a minimum of 60 months.

6) The Sony SAS shall process and retain acknowledgements by all entities registering CBSDs that they understand the risk of possible interference from federal Incumbent user radar operations in the band.

11. Please clarify how Sony will calculate and enforce PAL Protection Areas.

The Sony SAS will calculate and enforce PAL Protection Areas consistent with the requirements set forth in 47 C.F.R. 96.25(c)(2), with a default protection contour of −96 dBm/10 MHz around each CBSD. As required by 47 C.F.R. 96.41(d), the Sony SAS will not authorize CBSDs in a manner that will cause aggregate interference in excess of -80 dBm/10 MHz within a PAL Protection Area. Sony is actively participating in standardization efforts at the Wireless Innovation Forum, and will implement the requirements and methodologies that are the outcome of that process.

12. Please describe in more detail how the specific requirements regarding frequency assignments will be met by the SAS to assign contiguous channels?

The Sony SAS will enforce the band plan specified in the Commission's rules, consistent with the relevant WInnF specification. It will assign "steady-state" channels to PALs, will assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area, where feasible, and will cooperate with other SAS administrators to coordinate PAL channel assignment. It will support the Commission's goals of maximizing spectrum efficiency and utilization.

13. How will the SAS interface with FCC database(s) and update accordingly?

The Sony SAS will use an HTTPS (HTTP+TLS) to access the relevant federal databases at least once per day to obtain information about newly licensed facilities, or about any changes to licensed facilities.

14. Please affirm that the SAS will establish protocols for ensuring its compliance with the rules.

Sony affirms that it will establish and follow protocols and procedures to ensure compliance with the Commission's rules for SAS operation.

15. Please describe how the SAS will respond in a timely manner to verify, correct or remove, as appropriate, data in the event that the Commission or a party brings a claim of inaccuracies in the SAS to its attention.

The Sony SAS will use an HTTPS (HTTP+TLS) to access the relevant federal databases at least once per day to obtain information about newly licensed facilities, or about any changes to licensed facilities, and will update the data in the Sony SAS to reflect any changes.
In addition, as explained in the answer to question 9 above, Sony is developing a password-protected web application that will enable the Commission and Incumbent access users to have direct access to the data stored in the Sony SAS.

16. Please affirm that the SAS will comply with the requirement that the SAS operate without any connectivity to any military or other sensitive federal database or system, except as otherwise required by this part?

Sony affirms that the Sony SAS will operate without any connectivity to any military or other sensitive federal database or system, except as otherwise required by the Commission's rules.

17. Please acknowledge that the Commission, upon request, will review SAS fees and can require changes to those fees if they are found to be unreasonable?

Sony acknowledges that the Commission may review the fees charged for use of the Sony SAS, and can require changes to those fees if they are found to be unreasonable.

18. Please discuss specifically how the SAS will protect existing FSS earth stations and comply with each subsection of FCC rule section 96.17. If the SAS will permit excessive CBSD emissions upon mutual agreement, please discuss how the SAS will obtain the terms of this agreement and how it will communicate the terms promptly to other SAS Administrators.

The Sony SAS will obtain the list of FSS earth stations licensed in the 3600-3700 MHz band and 3700-4200 band from the Commission's database at www.fcc.gov/cbrs-protected-fss-sites.

Within 150 km of any FSS earth station operating in the 3600-3700 MHz band,[6] the Sony SAS will limit the power spectral density produced by emissions from all co-channel CBSDs in the manner specified in Section 96.17(a)(2) of the Commission's rules. In addition, the Sony SAS will limit the aggregate RF power produced by emissions from all CBSDs within 40 km of any such FSS earth station to the level required in Section 96.17(a)(3) of the Commission's rules.

Within 40 km of any FSS earth station operating in the 3700-4200 MHz band, the Sony SAS will

[6] FSS earth stations operating in the 3650-3700 MHz band will be afforded protection only after the conditions set forth in Section 96.21(c) of the Commission's rules are satisfied.

limit the aggregate passband RF power spectral density produced by emissions from all CBSDs in the manner specified in Section 96.17(b)(1) of the Commission's rules, and will limit the aggregate RF power produced by these CBSDs to the level required in Section 96.17(b)(2) of the Commission's rules.

If the licensee of an FSS earth station and the authorized user of a CBSD mutually agree to allow interference in excess of the levels specified in Section 96.17(a) and (b) of the Commission's rules, the Sony SAS will integrate and enforce the terms of such an agreement, and will communicate these terms to all of the SAS administrators through protocols currently under development by the WInnF.

19. Please elaborate on how the SAS will protect Federal Incumbents as well as clarify whether the Sony SAS will authorize Category B CBSDs.

a. Please make sure you demonstrate your understanding of which CBSDs may operate in which bands or when different categories may be authorized in relation to the presence of an ESC.

As required by Section 96.11(a) of the Commission's rules, the Sony SAS will authorize CBSDs in 3550-3700 MHz band; provided, however that the Sony SAS will authorize PAL operation only in the 3550-3650 MHz band, and will authorize GAA operation in the full 3550-3700 MHz band.

As required by Section 96.15(a)(3) of the Commission's rules, before an ESC is approved, the Sony SAS will authorize only Category A CBSDs, and will do so only for Category A CBSDs that operate in geographic areas outside of Exclusion Zones. It will not authorize any Category B CBSDs at that time.

After an ESC is approved and used by at least one SAS, the Sony SAS will authorize Category A CBSDs within protection zones consistent with information on federal frequency use provided by an approved ESC.

In addition, after an ESC is approved, the Sony SAS will authorize Category B CBSDs, and will do so consistent with information on the presence of a signal from a federal system provided by an approved ESC.

b. Describe how the SAS will confirm the suspension or relocation of a CSBD operating within the same frequency as a federal incumbent, including the timeline within this process for CSBD suspension or relocation.

Within 300 seconds of receiving a communication that an ESC has detected federal use on a given frequency inside a protection zone, the Sony SAS will instruct any associated CBSDs operating on that frequency and in that geographic area to terminate operations. If, after terminating operations, a CBSD requests authorization to continue operating within the protection zone, the Sony SAS will attempt to reauthorize the CBSD on a new, unoccupied frequency, if available.

20. Sony states that it "will provide the Commission with password-protected access and a web-based user interface that will enable the Commission to obtain information directly from the Sony SAS without requiring any additional involvement by Sony. This interface will also allow the Commission to discontinue operation of individual CBSDs." Please describe in the methods that the SAS will use to make information stored or retained by the SAS available in response to a request from authorized Commission personnel what operational restrictions will be implemented.

To enable access to information stored or retained by the Sony SAS, Sony is developing a password-protected web application that will enable the Commission and Incumbent access users to have direct access to the data in the Sony SAS without requiring any additional involvement by Sony.

21. Please provide more descriptive detail on the SAS capabilities for resolving interference and how this will be accomplished.

The Sony SAS will follow the requirements of Section 96.15 of the Commission's rules for protection of federal incumbent users, the requirements of Section 96.17 for protection of FSS earth stations, the requirements of Section 96.21 for protection of Grandfathered Wireless Broadband Licensees, and the requirements of Section 96.25(c) for protection of priority access licensees. To do so, the Sony SAS will follow interference calculation standards currently under development by the WInnF. In the event that the Sony SAS incorrectly authorizes a CBSD, as explained in the answer to Question 20 above, the Sony SAS will allow the Commission deactivate or restrict interfering CBSDs as necessary.

22. Please update the figure of proposed architecture to reflect a more detailed depiction of the SAS, beyond the functional interfaces.

Please see Annex A to this submission.

23. The proposal references an "NTIA Federal Incumbent database." Please clarify to what database you are referring.

The references to the “NTIA Federal Incumbent database” are intended to identify the database specified at 96.15(a)(3), containing the geolocation information for Exclusion or Protection Zones, available at ntia.doc.gov/category/3550-3650-mhz.

Affirmation

1. I, James Morgan, am Director and Counsel of Sony Electronics Inc., a subsidiary of Sony Corporation, submitter of the "Application of Sony Corporation to Serve As A Spectrum Access System Administrator" on April 2, 2016.

2. I am authorized to represent Sony Corporation before the Commission in matters pertaining to this application.

3. I affirm that, if chosen to serve as a spectrum access system ("SAS") administrator, Sony Corporation will comply with all applicable Commission rules, enforcement mechanisms, and procedures.

4. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on September 26, 2016

_____/s/_____

James Morgan
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ANNEX A –Architecture of Proposed Sony SAS